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MORE FOR LESS-AN ARMS CONTROL STRATEGY FOR THE 1990s

by

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Contents

	<i>Page</i>
DISCLAIMER	ii
FOREWORD	iv
PREFACE	v
ABOUT THE AUTHOR	vii
EXECUTIVE SUMMARY	viii
INTRODUCTION	1
STRATEGIC DETERRENCE AND THE TRIAD	2
FOLLOW-ON START NEGOTIATION OBJECTIVES	4
ASSESSMENT	9
LONG-RANGE BENEFITS	12
CONCLUSION	14
A NOTE ON ESSAY SOURCES	15

Foreword

The stunning changes in the complexion of international politics that began late in the decade of the 1980s and continue today will profoundly affect the American military establishment as a whole, and the US Air Force in particular. Decisions about the future course of the military will be made in the early part of the 1990s which will essentially determine the course of the US Air Force well into the twenty-first century. Decisions of such importance require thoughtful consideration of all points of view.

This report is one in a special series of CADRE Papers which address many of the issues that decision makers must consider when undertaking such momentous decisions. The list of subjects addressed in this special series is by no means exhaustive, and the treatment of each subject is certainly not definitive. However, the Papers do treat topics of considerable importance to the future of the US Air Force, treat them with care and originality, and provide valuable insights.

We believe this special series of CADRE Papers can be of considerable value to policymakers at all levels as they plan for the US Air Force and its role in the so-called postcontainment environment.

Preface

*No single thing abides, but all things flow
Fragment to fragment clings; the things thus grow
Until we know and name them. By degrees
They melt, and are no more the things we know.*

-Lucretius, "On the Nature of things"

The Story of Philosophy

Dramatic changes in the geopolitical landscape have proceeded with scarcely diminished vigor since the late 1980s, and show few signs of abating. In many respects, we can only begin to guess at the ultimate direction of these changes, much less their ultimate destination. Consequently, it is not surprising to find few, inside or outside the defense community, willing to venture a reflective analysis of the long-term implications of these changes for American security strategy. For, to quote Mark Twain, in view of the relative probability of being proven embarrassingly wrong by subsequent events, it would seem "better to remain silent and be thought a fool, than to open your mouth and remove all doubt. "

As is typical of human affairs in general, significant contradiction as well as uncertainty characterize the current flux in the international system. The possibility of more rather than less conflict at the regional level diminishes the promise of a world free from the tensions of perennial superpower competition. As the Bush administration recently noted, "the erosion of U.S.-Soviet bipolarity could permit and in some ways encourage the growth" of the threat to US security interests posed by regional conflicts throughout the world. Similarly, for a world long accustomed, but never reconciled, to the nightmare possibilities represented by nuclear weapons, recent developments in Soviet-American relations portend at least partial relief from what Albert Wohlstetter termed the "delicate balance of terror." Yet nuclear weapons production continues, new and improved warheads and delivery systems are developed and deployed, existing strategic and theater nuclear weapons remain in operational readiness, and the proliferation of technologies of mass destruction proceeds apace. The logic of such developments is as yet uncertain, while their grammar defies interpretation.

It is with one foot firmly planted in such realities that this collection of thoughts on the nuclear future is offered. This collection does not presume to be comprehensive in terms of exploring all issues of critical importance to the question of future nuclear ends and means. For example, discussions of the future implications of strategic defense or of advanced nuclear weapons technologies are notable for their absence. The omission of such issues here is not a judgment as to their relative importance as pieces in the unfolding strategic puzzle but rather the result of a conscious decision to begin with things as we know them. By examining first those dimensions of the nuclear equation most fundamental to the immediate security interests of the United States, such as the nature of the evolving strategic relationship between the United States and the Soviet Union as well as arms control options for lasting strategic stability, the essays here will, hopefully, provide a baseline for considering the shape of things to come. Neither do any of the contributions make an unqualified conceptual leap into the unknown by attempting to predict the future or proposing revolutionary solutions to the problems of a nuclear world. The

approach settled upon as potentially most useful to those charged with policy development was to project-and, where appropriate, prescribe-future nuclear weapons developments rather than to speculate as to what might be. This is not so much a matter of hedging one's bets as it is a tacit concession that the immediate future is an evolutionary extension of the present rather than a dramatic departure from the recent past.

The hope of the contributors and the editorial staff is that an examination of what we know about the attributes of nuclear weapons and how they relate to national power in this last decade of the twentieth century will, in a general sense, produce useful insights, if not answers, as to where we may (or should) be going. If the essays raise more questions than they answer, as long as such questions are ones that might not have arisen of their own accord, this effort will have accomplished its purpose.

At the risk of burdening the reader with unwanted debts, several acknowledgments must be made to those responsible for this project. First, to Col Dennis M. Drew, director of the Airpower Research Institute, who commissioned the Air Force Futures Project of which this is but a small part, and who, in inimitable fashion, allowed the contributors to "do their own thing" with no intellectual constraints as to the scope of the ideas to be considered. Second, to Drs David MacIsaac, director of research, and Lewis Ware, senior research fellow, whose scholarly insights helped to expose hidden flaws in both theme and development of the ideas on theater nuclear forces. Third, to Dr Richard Bailey, editor and professional historian, whose perspectives as to the scope of the historical change engulfing the world are matched only by his ability to make the words speak as the authors intended. Fourth, to Dot McCluskie and her production staff in the Air University Press for their unstinting efforts to make this project a published reality, and finally, to the essayists themselves, who bore with good humor the inevitable slings and barbs of the editorial process.

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Executive Summary

Strategic nuclear force structure requirements for the 1990s must be considered in light of the changing security environment, and particularly in terms of the Strategic Arms Reduction Talks (START). Because START will shape the relative strategic capabilities of the US and Soviet Union for the foreseeable future, it is imperative that the US devise the most cost-effective nuclear deterrent force possible within expected START constraints. The authors examine a number of force structure alternatives as to triad size and composition (or tetrad, if cruise missiles are considered) to determine how we might obtain the best possible deterrent guarantee for the best price under START limitations.

Introduction

The political realities of the past 40 years in Eastern Europe and the Soviet Union have changed with the leaves of fall in 1990. And like those leaves, the monolithic "evil empire" of the Soviet Communist party appears to have fallen and crumbled to dust, leaving fertile ground for peace and prosperity and a new international order. The perception that we "won the cold war," as manifest by the changes in Eastern Europe and the Soviet Union, has led for calls for the United States to demobilize, as we have done after every great war, and reap the advantages of the "peace dividends." These calls for a peace dividend are not frivolous. They reflect real political and fiscal pressures that have created an environment in which radical reductions in military budgets and capabilities are no longer unthinkable.

In the current political environment in which the unthinkable is thinkable, it is imperative that the military not be simple pawns that are moved about and traded off. Historically, the cost of poor moves and bad trades has been war. To ensure reductions in military budgets and capabilities do not pave the road to war, the military must embrace the process of change and help direct its flow. That means old "truths" that have served us well during the cold war and containment eras must be put to the test. One of those truths is the strategic deterrent triad of land-based intercontinental ballistic missiles (ICBM), manned penetrating bombers, and submarine launched ballistic missiles (SLBM). Given a world that demands fewer nuclear weapons and more strategic stability in the remaining weapons, is the triad still a truth, or is there a better way?

First the triad, as we know it today, is no longer a truth because we have not had a triad since the early 1980s when the first cruise missile went operational. The cruise missile is not a manned penetrating bomber, ICBM, or SLBM, even though it can be employed from aircraft, land-based modes, or the sea. The cruise missile has formed the fourth leg of a "tetrad." Once we accept that the traditional triad is not a truth, we can return to the basic principle of deterrence and take a fresh look at answering the question, is there a better way?

To provide a foundation for analysis in this paper, the first section reviews the concept of strategic deterrence and the triad in terms of strengths and weaknesses. Next is an identification of the set of arms control ground rules and sizing assumptions used to test the "truth" of various strategic options, followed by an assessment of these options. This assessment suggests that arms control and budgetary constraints and a credible strategic deterrent posture are not mutually

exclusive-there is a better way. More specifically, it argues that a new strategic triad of land-based strategic missiles, manned penetrating bombers, and cruise missiles simultaneously satisfies all three objectives-reducing the cost of strategic nuclear forces and the number of nuclear weapons while preserving a credible deterrence. The last section explores some of the long-range implications of this new strategic triad and the benefits it might offer our nation and the world.

Strategic Deterrence and the Triad

There are basically two forms of deterrence-deterrence based on denial and deterrence based on punishment. Denial deterrence (not to be confused with the US objective of "denying Soviet war aims") requires the capabilities and resources to defeat an attack without suffering significant damage. It is primarily defensive in nature and is the preferred form of deterrence since it directly protects and preserves that which we hold valuable. Unfortunately, a deterrence based on denial does not provide strong incentive against aggression or misconduct because it strictly limits the aggressor's costs and risks if he decides to strike. This rationale, coupled with the destructive potential of modern strategic weapons and the diversity of delivery options, precludes sole reliance on a denial deterrent strategy. Therefore, for the foreseeable future, US deterrent strategy must have as its foundation the concept of punishment.

Punitive deterrence has as its foundation the assured and acknowledged military capability to inflict the appropriate level of unacceptable pain in response to aggression, and the national will to employ that capability. For over 30 years the strategic triad and tetrad have been that capability. As fiscal and political pressures force reductions in the number of strategic weapons, it is absolutely critical that we take those reductions where they have the least impact on our ability to inflict carefully measured but unacceptable pain in response to strategic aggression. If we lose the ability to deter through punishment, stability will decrease.

Strategic stability, however, is coupled closely to a mutual perception of balance of capabilities. This critical balance need not be serendipitous. It can be carefully crafted through arms control agreements with provisions, noncooperative if necessary, to ensure absolute and unambiguous verification of compliance. Fortunately the fiscal and political pressures to reduce strategic arms are not our's alone. It appears the Soviets share in this burden and opportunity. Therefore it appears possible to tailor the reductions through arms control agreements so as to maintain a credible deterrence and simultaneously enhance international strategic stability. More

specifically, it may be possible to enhance both deterrent credibility and stability by targeting for reduction those weapons that are the most destabilizing. For this reason it is imperative that the military establishment embrace the processes of change and provide critical direction.

The triad and tetrad have served world peace well since the early 1960s. The strength of the triad and tetrad has been in the ability of the various legs to compensate for vulnerabilities in each of the other legs. There is a synergism in the whole based on the strengths of each of the legs.

For example, bombers are the most flexible and versatile in terms of roles, missions, areas, and tempo. With the accuracy and discrimination inherent in their Weapons and their heavy payload, they can be used across the entire spectrum of conflict. Because bombers are manned, they can be launched on warning and recalled; they can assess damage before restrike; they can surgically strike individual targets; and they can be reloaded again and again.

Land-based ballistic missiles characteristically have the highest alert rate and lowest operating costs. They have massive, prompt, hard-target-kill capabilities and, as a result, have incredible strategic "shock" power. They also are rapidly retargetable and have redundant and reliable positive command and control systems.

Submarine launched ballistic missiles have been considered the most survivable and enduring leg because our submarine stealth technology allowed them to hide effectively from all adversaries. With ample warning, the submarine has the capability for the most rapid response from launch order to warhead arrival.

Cruise missiles have enormous flexibility with deployment options that include all mediums of basing-land, sea, and air. However, the Intermediate range Nuclear Forces (INF) Treaty has largely removed the land mode of deployment from consideration. These weapons are highly accurate and, due to their small size, easily hidden. Currently a second-generation cruise missile with improved range, accuracy, and penetrability is undergoing test and evaluation and will soon be available for deployment.

On the other hand, each weapon system in the triad/tetrad has weaknesses. The bombers are slow compared to the missile systems and are vulnerable to anti-air operations and preemptive SLBM strikes, due to the SLBM's short time of flight. With a policy of launching only upon hard verification of a nuclear attack (nuclear detonations on American soil), ICBMs are vulnerable to a surprise mass missile raid because of the increasing accuracy and yield of the Soviet ICBMs. This tends to create a "use or lose" situation during the first few minutes of a nuclear exchange. The SLBM has a relatively low alert rate-for every three submarines in the inventory, only one is

on alert station. The remainder are in transit, undergoing overhaul, or in port for replenishment, maintenance, and crew exchange. Command and control is potentially slow and unreliable due to the depths, location, and alert status of the submarines. Also, because the submarines operate autonomously in international waters, they could be attacked without assured retaliation. Cruise missiles, the fourth leg, share many of the vulnerabilities of the manned bomber. Before launch, they can best be defeated while still in the "nest" with their launch platforms. After launch, they fly at subsonic speeds with predetermined flight profiles to the target.

Even given these vulnerabilities, the triad/tetrad has been a formidable system of deterrence and has enjoyed almost universal acceptance and support for several decades. Interestingly, the Soviets have adopted a similar strategic deterrent strategy. But the world has changed, and yesterday's solutions are not necessarily the right answers for tomorrow. The threat to world peace is changing, and failure to meet those changes effectively and affordably will threaten the integrity, vitality, and credibility of our strategic deterrent forces. We must consider restructuring our strategic forces and negotiating similar changes in the Soviet arsenals. If we, the military, do not take the initiative, we are at risk of being unilaterally disarmed by domestic fiscal pressures without compensating reductions in Soviet capabilities.

Follow-on START Negotiation Objectives

The primary United States objective in arms control must be to enhance our national security as the number of weapons are reduced. But as important as this objective is, there are other considerations that are vital to acceptance of any agreement when it is scrutinized by the public, military, and Congress: the Soviets; and the other members of the nuclear club. Some of these ancillary objectives are as follows.

Reductions must:

1. Preserve a reasonable strategic balance, increase overall strategic stability, and maintain appropriate levels of weapons to support our deterrent strategy. Considering each country's target base, the US would need to counter between 6,000 and 7,000 targets and the Soviets one-half that number for each side to hold the other at risk. One side cannot be asked to give substantially more than the other or to accept a position of strategic inferiority.
2. Address systems that are significant threats to US security and continue to support the US nuclear doctrine of flexible response. Arbitrary numbers as "total weapons goals" defeat our

deterrent strategy of sufficiency. The final results of any reduction must support our requirements.

3. Be absolutely verifiable without invasive, complex inspections. Reduction modifications to weapon systems must be impractical or impossible to reverse.

4. Limit the number of launch platforms under the premise that it is difficult or impossible to verify compliance at the individual weapon level.

5. Be simple to quantify and equate specifically, reductions should be in kind. For example, the INF Treaty eradicated missiles for missiles and resulted in the elimination of an entire class of weapons.

6. Be politically acceptable within the general US population and be significant in terms of reducing the number of nuclear weapons available to any nation included in the negotiations.

7. Result in lower costs in the strategic arena and not require significant increases in tactical systems to compensate for the reductions; that is, they must be cost-effective.

8. Reduce the probability of losing control of nuclear weapons as the result of an accident, sabotage, or radical change in either internal or external politics of the parties involved. This is particularly important today with the rapid changes taking place in Eastern Europe and the internal unrest within the Soviet Union.

9. Not create incentives to violate the terms or intent of the agreements.

Assumptions on Sizing Future Reductions

The trend in nuclear force structures is to "build down." This is a significant change from the "buildup" mentality of the 1970s and 1980s and represents a major challenge to those charged with designing deterrent force structures that will ensure peace.

The first assumption is that the current START proposals will be ratified without major change in their limits or definitions. The current proposal on the table at Geneva limits total accountable warheads to 6,000. Of these accountable warheads, 4,900 can be on ballistic missiles. Additionally, each side is limited to 1,600 strategic nuclear delivery vehicles (SNDV). Each ballistic missile or bomber counts as one SNDV. The bomber counting rule is embedded in the proposal and is designed with two main goals in mind: to encourage each side to place warheads on more stabilizing weapon systems such as bombers and to Simplify the counting procedures for air launched cruise missiles (ALCM). The INF Treaty addresses land-based cruise missiles, but sea based cruise missiles are not included in the discussions.

The US position, the one that seems most likely to be approved, is to allocate a value of 10 ALCMs to each ALCM capable aircraft. This counting rule allows each side to "discount" the ALCM carrier as to the number of ALCMs actually carried. Therefore, an aircraft that can carry more than 10 ALCMs will be assessed a warhead value of 10, while the aircraft counts as one SNDV. These bomber and ALCM counting rules explain the difference in accountable and actual weapons.

Another assumption, in view of the changing threat, is that there will be pressures to further reduce the strategic arsenals of the superpowers. Further, these reductions would be framed in similar types of limitations and have the same goals as previously listed. Primary among these goals is the desire to enhance stability as the strategic inventory shrinks. In an effort to bound the problem of a hypothetical START following the current effort, this paper has assumed a further 50-percent cut in strategic forces with the same type discount rules and limitations that are currently being considered. The force structures would have the following limitations: 3,000 accountable warheads of which 2,450 could be on ballistic missiles, and 800 SNDVs.

Options to Reach the New START Limitations

Outlined below are six options to size the strategic forces to meet the assumed START limits. There are an infinite number of options and force numbers that could be investigated, but these six are representative and offer a realistic comparison while bounding the problem.

Option 1 is the base case and shows that major cuts in the tetrad will be required to fit future START limits. This option requires the reduction of over 250 SNDVs and half of the accountable warheads. Due to the bomber discounting rules and the ballistic missile warhead limits, the majority of cuts must be made in the multiple warhead systems, the ballistic missiles. Each Minuteman (MM) III has three and each Trident D-5 missile has eight accountable warheads. Therefore, the elimination of each SNDV in these systems eliminates three or eight accountable warheads.

Option 2 shows the elimination of all land-based ICBMs and results in a triad of bombers, SLBMs, and cruise missiles. Due to START limitations, this option stops SLBM submarine production after Trident 13, and reduces tube capability from 24 to 23 in order to meet the 2,450 limit of ballistic missile warheads. However, this reduction in SLBMs still exceeds the accountable warhead limit of 3,000 by over 500.

Options 3 and 4 reduce the numbers of ALCM carriers and SLBMs to achieve START limits. To meet the assumed START limits, option 3 reduces the number of ALCM carriers (B-

52H) from 95 to 43. This action meets the limitations but results in the loss of 1,040 actual warheads, again because of the bomber / ALCM discount rules.

Option 4 reduces the number of submarines to 10, with 23 versus 24 operational tubes to meet the 3,000 accountable warhead limit.

Option 5 maintains the tetrad but reduces each ballistic missile leg. Each leg is small with nine submarines with 14 tubes each, 123 MM IIIs, and 50 Peacekeepers.

Option 6 includes ICBMs, bombers, and ALCMs and is the option that best balances the three constraints of the assumed START limits-SNDVs, accountable warheads, and ballistic missile warheads-while providing over 6,800 actual warheads.

Details of Options

Option 1: Maintain tetrad-retire Minuteman II, cap Trident submarines at 13 of planned 21 (nine are at sea and seven are funded).

SNDVs	Accountable Warheads	Actual Warheads
50 Peacekeeper (PK)	500*	500
312 D-5	2,496*	2,496
425 MM III	1,275*	1,275
95 B-52H (ALCM Carrier)	950	1,900
97 B-1B	97	1,552**
75 B-2	75	1,500**
<u>1,054***</u>	<u>5,393</u>	<u>9,223</u>

*Total of 4,241 accountable ballistic missile warheads. START would allow only 2,450.

**Based on 16 internal weapons per B-1B and 20 per B-2. Numbers could fluctuate depending on weapons configuration and fuel load. Reduction from 132 to 75 B-2s would reduce B-2 weapons to 1,500, a loss of 1,040 weapons and 57 SNDVs.

***Total of 1,111 SNDVs. START would allow only 800. Option 1 requires reduction in SNDVs and accountable warheads to meet assumptions about START limits.

Option 2: Retire all ICBMs, Fill 23 of 24 tubes on 13 Trident submarines to remain below 2,450 ballistic missile warhead limit.

SNDVs	Accountable Warheads	Actual Warheads
299 D-5	2,392	2,392
95 B-52H	950	1,900
97 B-1B	97	1,552
75 B-2	75	1,500
<u>566</u>	<u>3,514*</u>	<u>7,344</u>

*3,514 exceeds 3,000 accountable warhead limit. Option 3 reduces B-52Hs and option 4 reduces SLBMs to reach warhead limit.

Option 3: Reduce B-52Hs to 43, keep 13 submarines.

SNDVs	Accountable Warheads	Actual Warheads
299 D-5	2,392	2,392
43 B-52H	430	860
97 B-1B	97	1,552
75 B-2	75	1,500
<u>514</u>	<u>2,994</u>	<u>6,304</u>

Option 3 results in a loss of over 55 percent of B-52Hs (the primary conventional strategic asset after the mid -1990s) and has the lowest number of actual weapons of any of the options,

Option 4: Reduce submarines to 10 with 23 tubes each to reach limits.

SNDVs	Accountable Warheads	Actual Warheads
230 D-5	1,840	1,840
95 B-52H	950	1,900
97 B-1B	97	1,552
75 B-2	75	1,500
<u>497</u>	<u>2,962</u>	<u>6,792</u>

This results in a cancellation of three Trident submarines compared with option 2.

Option 5: Tetrad with small ICBM and SLBM legs. Nine submarines have 14 tubes.

SNDVs	Accountable Warheads	Actual Warheads
126 D-5	1,008	1,008
123 MM III	369	369
50 PK	500	500
95 B-52H	950	1,900
97 B-1B	97	1,552
75 B-2	75	1,500
<u>566</u>	<u>2,999</u>	<u>6,829</u>

Option 6: Triad of ICBMs, bombers, and ALCMs-eliminate all SLBMs.

SNDVs	Accountable Warheads	Actual Warheads
50 PK	500	500
459 MM III	1,377	1,377
95 B-52H	950	1,900
97 B-1B	97	1,552
75 B-2	75	1,500
<u>776</u>	<u>2,999</u>	<u>6,829</u>

Assessment

A triad of land-based ICBMs, ALCMs, and bombers, like the one described in option 6, meets all the negotiation objectives listed earlier. This modernized triad offers all the strengths of the current tetrad and eliminates the weaknesses, such as low alert rates and poor connectivity ingrained in the SLBM. These changes also increase stability in the nuclear response forces by eliminating the greatest threat to our national command authorities (NCA), bomber force, and command and control systems-the Soviet SLBMs. Due to the mobility factor of the modernized ICBMs-rail-mobile Peacekeepers-the ICBM leg will regain the survivability it lost with deployment of modern, accurate Soviet ICBM systems. Like the SLBMs, the Peacekeepers will be able to deploy and hide in millions of square miles, thus making them survivable and enduring. Additionally, by eliminating SLBMs, our nuclear forces would be more mission survivable, due to more time for secure, reliable communications with the NCA, and result in more weapons available for deterrence due to the high alert rate of ICBMs. The SLBM alert rate is approximately 30 percent, while the ICBM alert rate is over 95 percent.

Eliminating the SLBM from both superpower inventories increases stability. As we look at reductions, normally we focus on "what we give up" and neglect "what we get" when the other side gives up a weapon system. The elimination of the Soviet SLBM threat is the single most compelling reason to replace the tetrad with this triad. The Soviet SLBM is the system that most directly threatens our NCA, bomber force, and the connectivity with all our nuclear forces, due to the short flight time of Soviet SLBMs. These flight times may be as small as eight minutes depending on geographic target location and submarine location. This short flight time forces our NCA to near instantaneous response decisions upon notification of "missiles inbound." Elimination of this threat would increase our attack assessment and decision response time three- to four fold over the amount of time we have for these critical decisions today. These extra minutes make the difference in a measured response versus a nuclear spasm.

This triad will aid in our doctrine of flexible response due to reliable communications with these land-based forces and greater survivability. These forces can be retargeted much easier and quicker than those at sea, and by maintaining a strong mix of bombers, the NCA will have readily available forces to target a single weapon against a single target if desired. With more weapons on alert compared to the number available with the SLBM, our national command authorities would have more flexibility in response options than with other triad mixes. For example, if an SLBM were used for selective strike, the target would receive eight warheads in a constrained "footprint." Additionally, it is chancy to fire only a portion of the SLBMs on a submarine and be assured the remainder are secure for later use, due to the chance of revealing the submarine's position and making it vulnerable to antisubmarine warfare (ASW).

A comparison of the number of ballistic missile alert weapons available reveals 1,877 for option 6 (the recommended option) and 552 for option 4 (the SLBM and bomber triad). Over three times as many ballistic missiles would be available for retaliatory strike by using ICBMs instead of SLBMs. In option 4, there would only be three submarines on alert (in firing position) at anyone time. A single Soviet torpedo, stray mine, or catastrophic accident could reduce the nation's ballistic missile deterrence by 33 percent if a single submarine were lost.

SLBMs would be the simplest leg of the tetrad to eliminate in terms of arms control verification and the one most impractical to reverse once the submarines have been rendered incapable of supporting a SLBM or destroyed, depending on the terms of the treaties. Each nation's requirements for submarines to perform other duties, like defending sea-lanes of communications, would not be hampered by these agreements. Each nation knows exactly how many SLBM submarines the other has and each has already instituted varying degrees of

verification/counting procedures for SLBMs under current treaties. It would be simple and minimally invasive for each side to ensure that the SLBM submarines were either destroyed, modified for other uses, or had their SLBM hatches welded shut after being filled with ballast materials.

Elimination of an entire class of weapons, in this case SLBMs, would be in concert with recent reductions in nuclear weapons. The INF Treaty was heralded around the world as a major breakthrough in arms negotiations. This type of reduction was so unique that the nuclear doomsday clock, that has been slowly inching its way toward midnight (doomsday) for the past few decades, was set back a few minutes, signifying a safer world. Destruction of another class of weapons instead of piecemeal reduction of all types-no matter the number-has an impact that cannot be matched by other avenues of cuts.

The only objective not yet addressed directly is the issue of cost. Even though cost should not be the major criterion when the security of the nation is at stake, we cannot dodge the issue in this era of public demand for less defense expenditures. If the nation can provide for its security more efficiently, then it should do so. In a period of further START reductions, like those outlined thus far, we can have increased security for less cost.

It is difficult to determine an exact cost for the options discussed, but the following figures will serve to illustrate the magnitude of the savings if we were to adopt the ICBM/bomber/cruise missile triad. The ICBM is the most cost-effective leg of the current tetrad, consuming approximately 19 percent of the annual support costs while carrying 75-80 percent of the warheads in day-to-day alert. The support costs for the SLBM is over 50 percent more than that of the ICBM, while that force carries approximately 15 percent of the day-to-day alert warheads. Additionally, the procurement cost of each Trident SSBN with D-5 missiles is approximately \$2.2 billion, not including such items as crew; maintenance; research, development, test and evaluation (RDT&E); and support. The Navy plans on procuring 21 of these boats-nine are already under way, seven are in various stages of construction or funding, and another five are in the out-year budgets. Ignoring the possibility of canceling current construction or funding, we plan on spending \$11 billion on the remainder of the SLBM fleet. By comparison, the Peacekeeper rail garrison's (rail-mobile ICBMs) cost for deployment is \$5.6 billion spread over seven years (fiscal years 1989-95).

By any method of cost analysis, a triad of ballistic missiles (mobile Peacekeepers and Minuteman IIIs), ALCMs, and bombers is more cost-effective and cost efficient than any option that includes SLBMs. The SLBM has redundant capabilities in a modernized triad, at a higher

cost when compared with the ICBM-50-percent higher operating cost, one-third of the alert posture, and enough current and out-year funding to pay for mobile Peacekeepers three times over. In an era of future arms reductions and tightening budgets, a deterrent structure that includes the SLBM is "nice to have," but it is not necessary to the security of this nation and is not fiscally responsible. Most importantly, elimination of SLBMs from both sides increases stability and security. In a final accounting, the United States really does get "more for less" if SLBMs are eliminated through START negotiations.

Long-Range Benefits

The purpose of this paper has been to advocate a change in the deterrent strategy of the United States-reshape our strategic nuclear forces to a triad of ICBMs, bombers, and cruise missiles. To ensure that this shift is not a shortsighted exercise that leaves this nation vulnerable or without flexible options for the future, it would be prudent to look at the impacts of this change.

Bomber and Missile Survivability

If we eliminate submarine launched ballistic missiles, then we must answer the fundamental question: How does the US ensure the survival of a retaliatory force in a surprise attack? First, the bombers are more survivable in a world in which nations have eliminated SLBMs because the attack warning time will be substantially increased. Since the bombers are recallable, they can be launched on warning provided by satellites. Satellite warning time corresponds to 20 to 30 minutes.

While the bombers are recallable if launched on warning, missiles are not. This creates a powerful incentive to not launch on warning of an attack under the presumption that the attack warning system may malfunction. For the purpose of this analysis, the author presumes that the missiles would not be committed to launch until the attack is verified by the occurrence of nuclear detonations on sovereign US soil. Given the accuracy and yield of the Soviet ICBMs, such a presumption places the nonmobile, land-based missiles at risk in a preemptive strike.

If, however, absolute verification of an attack can be moved forward in time to about 15 minutes before the first warhead impacts, mission survival of the land-based missiles would be assured by launch upon that verification. That absolute and timely verification of an attack could be provided by a very limited deployment of the first phase of the Strategic Defense Initiative

(SDI) shield. With the SLBM eliminated, the practical azimuths of attack on the missile fields are reduced, allowing a single Antiballistic Missile (ABM) Treaty-compliant defensive system to absolutely guarantee mission survival of the nonmobile ICBMs. Such an ABM system would defeat any small-scale attack, accidental or otherwise, while providing the capability to definitively probe-that is, absolutely verify-a large-scale attack against the United States. Once the attack is probed-that is, a number of intercepts made and the debris remotely evaluated to determine the types of warheads involved-the NCA could release the ICBMs that were at risk for a retaliatory strike.

Nuclear Terrorism

Currently, four developing nations have nuclear weapons and seven have long-range missile systems. By eliminating SLBMs from the arsenals of the superpowers, the Soviet Union and the United States would be less likely to be "tricked" into war by an unstable third world dictator, like Muammar Qadhafi. Proliferation of sophisticated weapons and delivery systems is accelerating. And they are available to those willing to pay the price. In the current decade, it is not unthinkable that the means of underwater missile deployment could become available to these same third-world countries.

Under current force profiles, if a nuclear-armed weapon were launched from under the sea and impacted on Soviet or US territory, each of the superpowers would blame the other, and denials may not come quickly enough to avert catastrophe. The Soviets have an excellent capability to look into our missile fields, as we do theirs, and determine if an ICBM came from our soil. However, their capability to detect a launch from under the oceans is limited. The United States is not similarly limited in this capability, but once launched and in the absence of conflicting information, the US would assume that the missile was Soviet. By removing the SLBMs from both inventories, the United States and Soviet Union would know that an SLBM attack would not be the work of the other country and would avoid being dragged into a nuclear exchange by a third party.

Technological Breakthroughs

One of the reasons the triad/tetrad has always enjoyed support has been the rationale that a technological breakthrough could render one of the legs vulnerable but not put our deterrent strategy at risk. To this end, it appears that the Soviets have already made inroads into the strengths the US has enjoyed in submarine technology and antisubmarine warfare. Improvements

in the Soviet Delta IV and Typhoon submarines have made them quieter, and they are armed with more accurate missiles. Therefore they are more difficult to pinpoint and they put more of our forces at risk, including many of our "hard" targets. Each generation of Soviet submarine is quieter and narrows the technology gap, making the new ships more difficult to track. And defend against. The Soviets appear to believe the technology to hide their submarines is within their reach, and they fund it appropriately.

The Soviets also heavily fund their ASW effort, and both the US and Soviets are working feverishly to make improvements. Currently, the US and its allies have the advantage in ASW; however, the Soviets are pursuing the technology to develop a space-based ASW surveillance system that theoretically could render the oceans transparent to great depths. It is only logical to assume that the US is pursuing similar capabilities to defend primarily against the SLBM threat.

Indirect "Savings"

Assuming the SLBMs are eliminated through START negotiations, there are other savings that could be realized in a more stable and secure world environment. The US military stands ready to respond to Soviet nuclear attack at "a moment's notice." This capability to react instantaneously is known as alert. There are thousands of military members on alert at this very moment, each ready to respond. This capability is costly, not only in dollars, but also in human stresses-and stresses can cause mistakes. It is entirely feasible and reasonable that a reduction in the threat could be accompanied by a relaxation in the number of systems on immediate alert or the level of alert status. As an example, the US bomber force commits approximately one-third of its airframes to immediate alert, known as alpha alert. The crews are restricted to the alert facility or selected parts of the base to be able to launch their aircraft in a matter of minutes.

If the primary threat to the alert aircraft, the SLBMs, was eliminated and the aircrews had three to four times the reaction times they now have, it is logical that a reduced alert status would be appropriate. In and of itself, this is a less threatening and more stabilizing position with no loss of security. A similar case could be made for the ICBM force, depending on the deployment mode and location.

Conclusion

The overarching thesis of this paper is that the United States must seize the changes that are taking place in the world and benefit from them. It is time to act and not react-a time to set the

agenda and make our world safer and more secure. At the same time, we must realize that the biggest threat to our national survival is still the nuclear forces of the Soviet Union. Our objective remains as it always was-to counter that threat. In the past decades both nations have countered the threat of the other by building up their arms, and in doing so, the balance that each was trying to obtain became unstable. With the recent changes in the Soviet Union, for whatever reason, the door is open to a build down in nuclear weapons, and the opportunity to add stability to the remaining systems is within reach.

As we reach for that opportunity, some of the "truths" that have served us well during the arms buildups should be revisited to determine if they are relevant, to the end position each side is striving to obtain-security, stability, and reduced costs. While elimination of an entire class of nuclear weapon systems reduces the threatening posture of each side, elimination of the SLBM most enhances those objectives. With its removal, the nation's deterrent strategy is still served by a triad that has all the benefits of the former triad and tetrad. At the same time we enjoy these benefits for less cost in a safer world. A triad of ICBMs, bombers, and cruise missiles does give this nation "more for less."

A Note On Essay Sources

The data in this essay was compiled from numerous unclassified Department of Defense publications dealing with strategic nuclear force structure and arms control issues, as well as from sources in the nonmilitary sector. Two references, in particular, provided conceptual and quantitative material for the essay:

Barry R Schneider, "Dyad or Triad," *Defense & Diplomacy* 7, no. 9 (September 1989): 30-35; and Arms Control and Disarmament Agency, *Issues Brief: Strategic Arms Reduction Talks (START)* (Washington, D.C.: Government Printing Office, 25 April 1991).